Sutherland 2012 June Installation of Tiger Counters

Hale, Steven J.

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Steven J. Hale

The University of Birmingham, Edgbaston, Birmingham B15 2TT

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THE UNIVERSITY OF BIRMINGHAM

High-Resolution Optical-Spectroscopy Group

School of Physics and Astronomy
The University of Birmingham
Edgbaston, Birmingham B15 2TT, United Kingdom
Telephone: +44-121-414-4551 FAX: +44-121-414-1438

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Abstract

The gating on the original counters had failed. Only the first channel (FSTAR) was producing any useful data. On this trip, the counters were removed and replaced with the new "Tiger Counters". Also, a new pan/tilt network camera was installed.

1 Introduction

Steven Hale visited Sutherland from 2012 June 16 to June 26. The primary purpose of the trip was to replace the counters. The weather was particularly bad for the majority of the visit, with continuous heavy cloud and rain. Just enough clear weather was obtained to check that the new counters were working and to calibrate the Pockels cell drivers.

2 Tiger Counters

Installing the Tiger counters was relatively easy. The power cable was taken from the old counters and connected to the Tiger counters, this means that the mains controller configuration remains the same as before. The three detector BNCs and two PCD BNCs were moved across. This required some rerouting of cables since the old counters had connections on the front, whereas the Tiger counters have the connections on the back. A new MODBIT (sync) cable had to be made since the old counters did not use a BNC connector.

After changing the Zoo configuration to disable the Leopard and enable the Tiger, the counters began working immediately.

The old counters have been left in place. If we need to switch back to them, all that has to be done is to move the detector and PCD connectors back, and reconnect the power. Then the Zoo calibration can be changed back to using the Leopard rather than the Tiger.

3 PCD Calibration

Both the Pockels cell drivers were calibrated following the change to the Tiger counters.

The EOLM output from the Tiger counters is quite a bit higher than from the old gate module. With our new PCD units calibration would not have been necessary since they are logic controlled. However, the old "Richard Lines" PCD drivers are basically just big amplifiers and so the calibration is dependent on the voltage from the gate module.

The delta-B was disconnected and the magnetic Pockels cell removed. The driver was scanned over the full range while looking at the velocity ratio output from the detectors. The results are in figure 1. The initial setting was "750", the new scan suggests the best setting is "575" and so the velocity driver was adjusted to the new optimum.

Calibrating the magnetic Pockels cell is slightly more tricky. The magnetic Pockels cell was replaced, and the velocity Pockels cell removed. The magnetic Pockels cell was then moved behind the polariser into the velocity position. The scan was then repeated using the magnetic cell and driver. The results are in figure 2. The initial setting was "375", the new scan suggests the best setting is "400" and so the magnetic driver was adjusted to the new optimum.

All optical components were then moved back to their original positions.

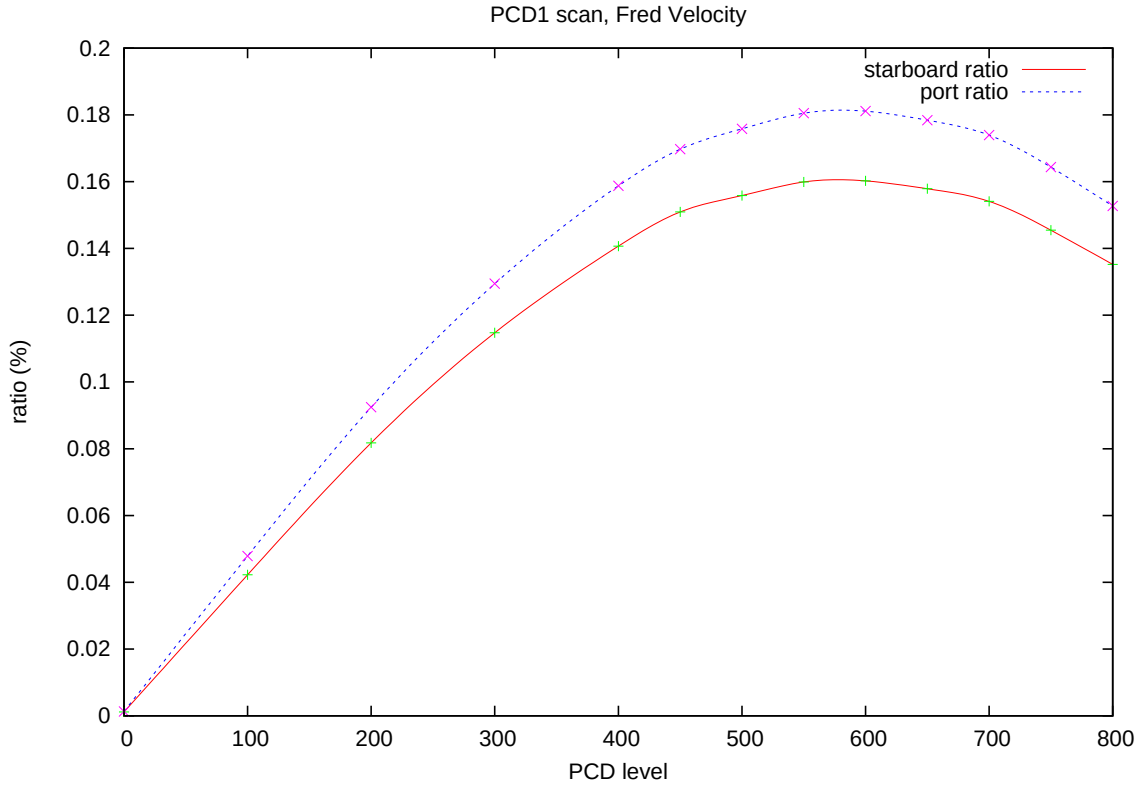

Figure 1: Velocity PCD scan.

4 delta-B

The delta-B module has two LEDs that indicate which magnetic state it is in, and a digital read out that shows the current flowing through the coils. In the "red" state the display shows

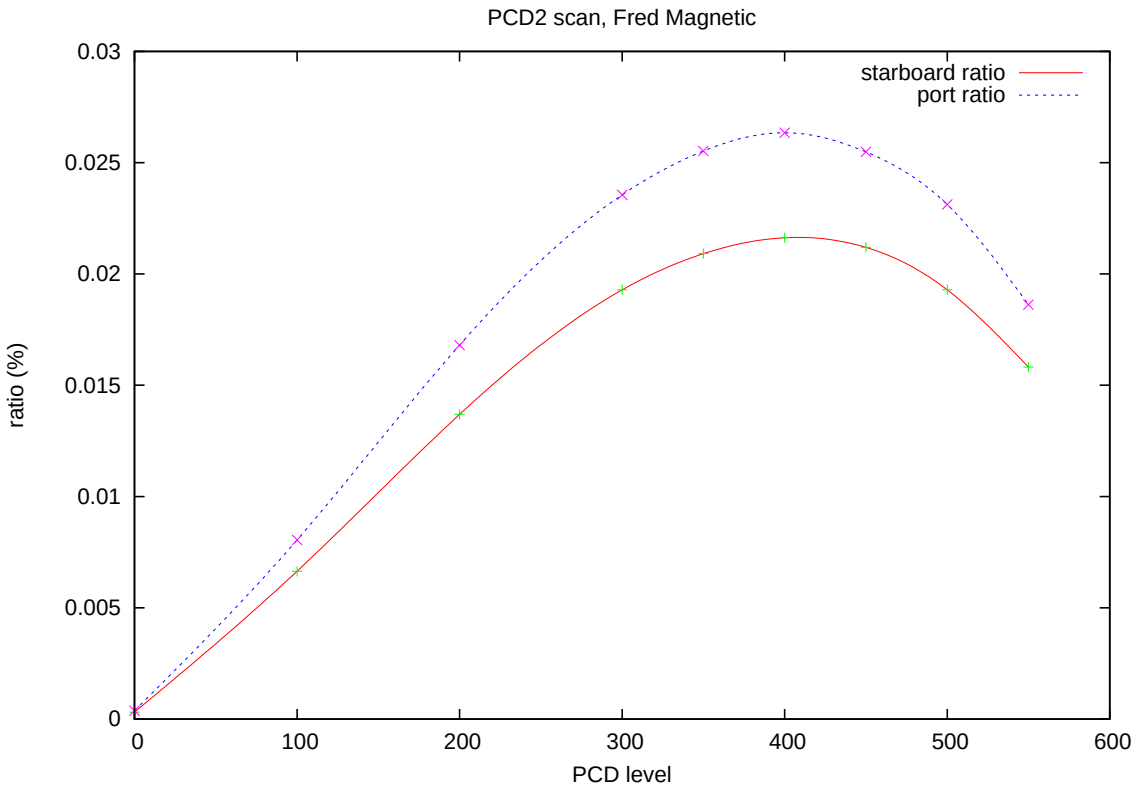

Figure 2: Magnetic PCD scan.

191 A. This must mean milli-amps because 191 Amps would be very silly. In the "green" state the display shows 002 A.

Now the question is, is it just the display that is broken or the whole module? Well, when it is in the "red" state showing 191 A if you listen very carefully the module makes a slight buzzing sound. When it is in the "green" state showing 002 A the buzzing stops. If the output cable is disconnected, then the display shows 002 A in both states, and the module never buzzes. This indicates that current is only being driven through the coils in the "red" state.

When the module is in the bad state, simply tapping on the case of the switching relay sometimes makes it work. It looks like the relay is bad - most likely a dirty contact. The unit is sealed and can not be repaired, and so the relay will have to be replaced.

The relay is RS part number 346-845. Obviously due to the age it is discontinued. RS suggest 351-831 an an alternative. It appears to be pin compatible and of the same specification.

It may be tricky to replace the relay without damaging the board. The existing relay is soldered down tight onto the board. It would not be possible to cut the pins to remove the component and then remove the pins individually. It would be necessary to try to unsolder all the pins at the same time and remove the whole relay.

Whilst it was possible to order components from RS while in Sutherland, the delivery time was too long and a new relay would not have arrived before the end of the site visit. The delta-B has been left disabled.

Jaci Cloete is going to order the relay for us and attempt to change it. She will let us know if she is successful.

Should the delta-B module be enabled again, there is an issue with synchronising the switching time with the new counters. The delta-B must never switch states while the counters are counting.

Currently, the delta-B switches after 3.5 seconds of the 4 second data acquisition period. The delta-B switches a fraction of a second before the light on the counters flashes to indicate they have sent their data. This is too soon, and will need to be changed. In Narrabri the counters count for 3.9 seconds and so the delta-B has to switch very late in the cycle.

The delta-B switching time is controlled by a setting in the Cricket. The "Leopard" that controls the old counters has the ability to change the time through a setting in the zoo.conf file. The "Tiger" can not currently do this. The Tiger will need to be modified using the Leopard code to add this feature.

5 Foscam

The previous camera was an expensive one from Axis, and failed due to water damage [1]. The new camera is a cheap Foscam. Its image quality is not as good as that of the Axis camera. But it does have two advantages: it has a two-axis motorized mount and it has IR LEDs so that it can see the mount at night.

The camera has been mounted near the bottom of the dome and at a greater distance from the shutter. It is hoped that this will keep the water out.

6 Fedora Upgrade

The computer had been upgraded to Fedora 14 on the previous visit. On this trip, the computer was upgraded to the latest Fedora 17. However, problems with the Zoo device drivers and the latest kernel required the system to be rolled back to Fedora 14. Further testing is required on Fedora 17 before the upgrade can be attempted again.

References

[1] Steven J. Hale. Sutherland 2011 March port detector Peltier repair. *BISON Technical Report Series,* Number 345, High-Resolution Optical-Spectroscopy Group, Birmingham, United Kingdom, June 2011.